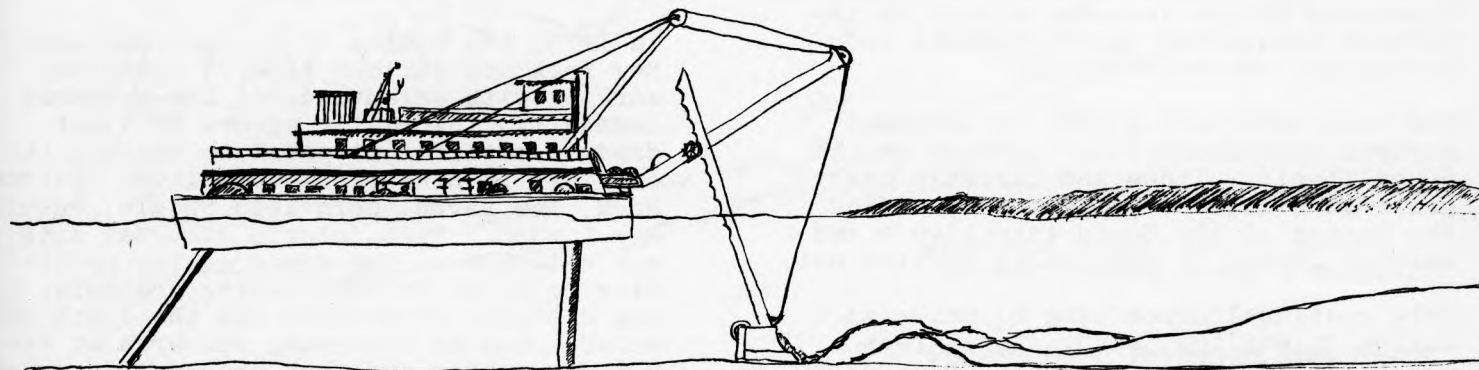


# DEP



# CITIZENS' BULLETIN



## The Dredging Dilemma

Long Island Sound -- 930 square miles of open water providing the people of Connecticut and New York with a vital transportation artery, a productive commercial and sport fishery, and a valuable recreation resource.

For the people of Connecticut, the links to the Sound are the many harbors along the state's 253-mile coastline. These are the busy areas of commercial waterfront, oil storage tank farms, marinas and boat basins. In order to keep these areas open to navigation, the U.S. Army Corps of Engineers dredges these harbor bottoms. In some cases, the purpose of the dredging is simply to maintain an existing channel at a safe depth; in other cases, a harbor is dredged to create a new channel for deep draft vessels.

In the next ten years, DEP conservatively estimates that the dredging of Connecticut harbors will produce 8.5 million cubic yards of dredged material or "spoil". Recently, environmentalists have become concerned about the disposal of dredged spoil in the open waters of the Sound. They fear that chemical and biological contaminants in the spoil might be harmful to the organisms in the Sound and perhaps ultimately to man himself. While there is no hard data to support these fears, enough questions have been raised to cause the Department to carefully examine the entire issue of dredged spoil disposal.

### THE ORIGIN OF SPOIL DISPOSAL

The spoil dredged from Connecticut harbors is sand, silt and organic material. It originates from several sources. Erosion

## In this issue

<i>The Dredging Dilemma.....</i>	<i>1</i>
<i>Institute of Water Resources</i>	
<i>The Willimantic River Study.....</i>	<i>5</i>
<i>Reader's Forum.....</i>	<i>6</i>
<i>Editor's Note.....</i>	<i>6</i>
<i>The Federal Duck Stamp:</i>	
<i>Not Just for Hunters.....</i>	<i>7</i>
<i>New Publications.....</i>	<i>8</i>
<i>Solar Energy: A Bright Prospect...</i>	<i>9</i>
<i>Solar Energy Course.....</i>	<i>11</i>
<i>Conservation Commission Corner.....</i>	<i>12</i>
<i>In the Field.....</i>	<i>13</i>
<i>Permit Information Office.....</i>	<i>14</i>
<i>Learn About Land Use.....</i>	<i>15</i>
<i>EPA Citizen Briefing.....</i>	<i>16</i>

and run-off in upland watersheds, for example, carries silt into streams and rivers. This silt then moves downstream toward the Sound, until it meets the salt water moving upstream. There the silt is deposited, adding new material to the harbor bottom. In most Connecticut harbors, however, this upland silt amounts to only a small fraction of the sediments which must be dredged.

Industrial and municipal wastewater discharges also add a small amount of solid material to receiving streams. These discharges, though small in the volume of suspended solids introduced, can be important because of their chemical and biological characteristics.

The most important source of sediment dredged from Connecticut harbors is the Sound itself. Tides and currents carry great quantities of sand and silt from the bottom of the Sound into rivers and harbors, where it eventually settles out.

This continual depositing of material builds up shallow, sandy shoal areas and fills in channels, posing hazards to navigation and hampering waterborne transportation.

#### THE PROBLEMS OF SPOIL DISPOSAL

Generally there is little controversy surrounding the actual dredging of a harbor, because most people seem to agree that its benefits strongly outweigh its costs. The disposal of the dredged material, however, has provoked sharp conflict in recent years and precipitated a number of court cases.

In Connecticut, dredged material is normally disposed of either on the land or in Long Island Sound. In the past, dredged spoil was often dumped on tidal wetlands to "reclaim" them. Fortunately, the State's Tidal Wetlands Act eliminated this practice by bringing these valuable wetlands under State protection. In the meantime, land disposal has become increasingly difficult and expensive with the growth and development of the State's coastal towns. The high cost of land transportation makes it imperative that any land disposal site be close to the harbor being dredged. At the same time,

potential water pollution problems require that the site be environmentally suitable for disposal. The number of sites appropriate for land disposal of dredged material has become exceedingly small, especially in the intensively-developed areas of Fairfield County.

As a result, Long Island Sound has become the primary resting place for dredged spoil. Spoil disposal in the Sound is now regulated jointly by the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the States of New York and Connecticut.

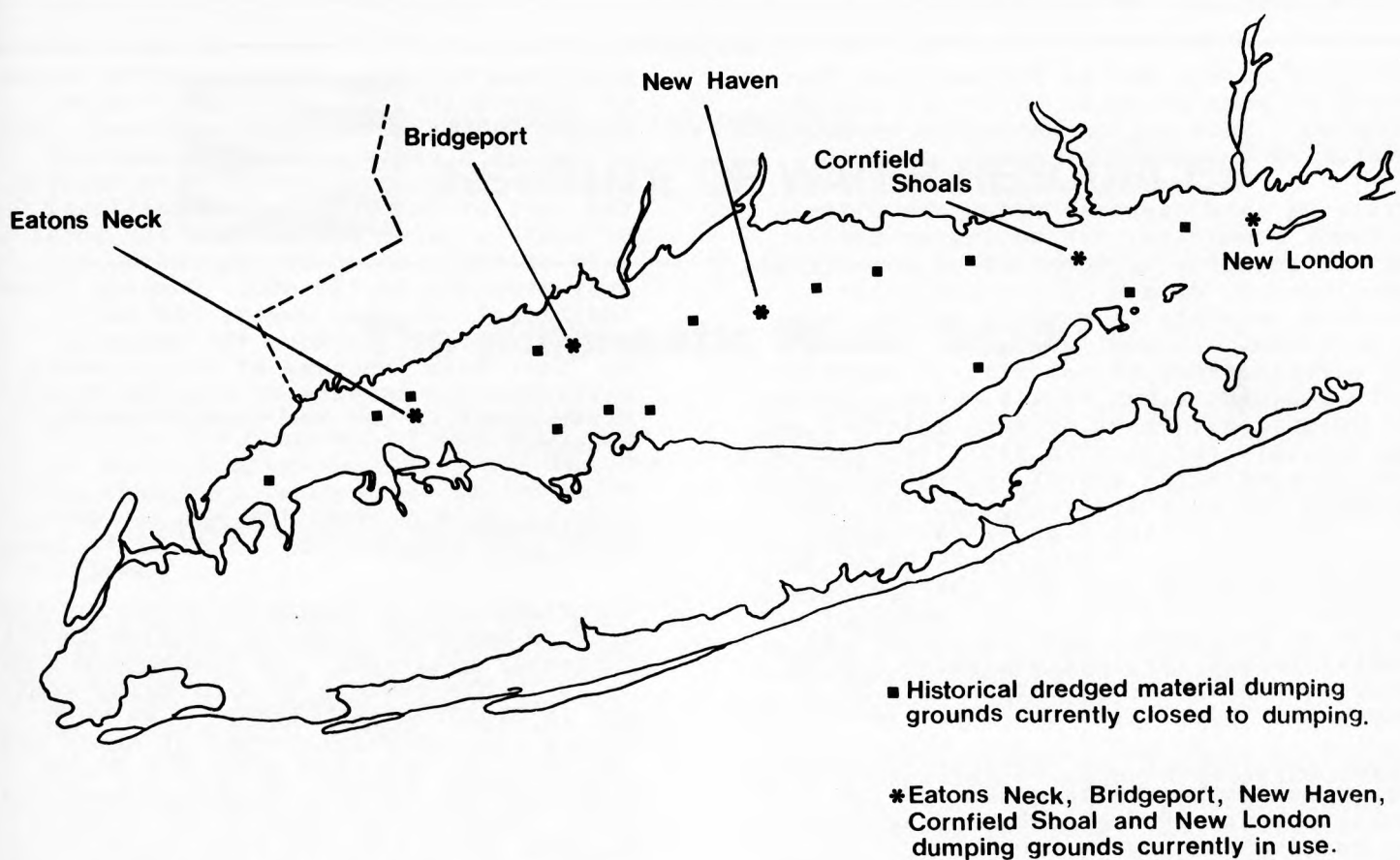
In 1973, the States of Connecticut and New York and various federal agencies, working with scientists in the academic community, informally agreed to limit dredged material disposal to four of the original 19 historical dumpsites: Eatons Neck, New Haven, Cornfield Shoals, and New London. Each interim disposal site was selected on the basis of its proximity to major Corps dredging projects, the distance from shore and the depth of water. Due to one-going research at the New Haven site and then-proposed research at Eatons Neck, these two sites were closed and the Bridgeport dumping ground was designated as an interim dump for "clean" dredged material as determined on a case by case basis.

The impacts of spoil dumping on the natural environment are not fully known. Short term impacts, however, seem to be minimal. The benthic (bottom-dwelling) organisms at the site, such as shellfish and worms, are buried by spoil, but studies to date have shown that once dumping has stopped, the organisms recolonize the area fairly quickly. The impact of dumping on pelagic (free-swimming) organisms, like fish, has been shown to be insignificant, because they are able to leave the immediate area of the disposal area during the dumping operation.

Water quality at a disposal site may be diminished during the dumping operation, particularly with respect to levels of suspended solids in the water column. However, the increased suspended solids levels and other water quality elements quickly return to normal pre-disposal levels when the dumping ceases.

Unfortunately, measurements of chemical and biological factors in undisturbed areas vary widely throughout the Sound. This wide variation in normal background levels makes it difficult to evaluate short-term changes in water quality attributable to dumping activities. Further research is required to determine what, if any, contribution is made to background levels by dredged material disposal.





Another concern is that the impact of hurricanes or other major storms on dredged spoil dispersal has not been studied. To date no major negative impacts attributable to extensive spoil dispersal have been identified in the Sound. Studies along the Atlantic and Gulf Coasts, on the other hand, have reported significant movements of spoil out of disposal areas which were attributable to high-energy, wind-driven waves and currents. The water movement patterns and dredging methods noted in these studies, however, differ significantly from those in Long Island Sound, and, for this reason, the results of the studies are not considered directly applicable.

The long-term impacts of dredged spoil disposal in the Sound are not known. No formal studies undertaken to date have examined the effects of spoil dumping for more than two years after completion of a disposal project. More information on long-term impacts is obviously needed.

Future research efforts must focus on whether chemicals contained in dredged spoil are introduced into food chains leading to man, and if so, whether the chemicals adversely affect man or any of the organisms below him in the chain. Research has shown that the tissues of worms, molluscs and algae contain concentrations of certain heavy metals which are a thousand times higher than the concentrations of the metals in the surrounding water or surface sediment. In one Long Island Sound study, for example, the con-

centration of zinc in organism tissue compared to surrounding water was 305,000 to one; for copper 33,000 to one; and for mercury 1,100 to one. These and other studies have shown that surprisingly high concentrations of metals may be found in organisms living in clean as well as polluted waters along the coast. And neither the organisms nor their natural consumers suffer any apparent ill effects from seemingly-high concentrations of metals in body tissues.

In general, then, there have been no major observed environmental impacts from dredged spoil disposal on the Sound, but enough questions are currently unanswered that continuation of spoil dumping must be critically examined and a comprehensive spoil disposal management plan developed. Special attention must be paid to location of dumpsites and an evaluation of the chemical and biological composition of spoil material and its suitability for disposal in the Sound.

#### ALTERNATIVES

As indicated, if all existing or proposed navigation channels, harbors, boat slips and basins are dredged over the next ten years, there will be an estimated 8.5 million cubic yards of dredged material which will require disposal. At present disposal, either in Long Island Sound or the Atlantic Ocean, seems to be the most realistic solution for this semi-solid waste-disposal problem, short of not dredging in the first place. The no-



dredging option may be the best one for parts of some projects which are quickly shoaled. This option should be seriously evaluated Sound-wide.

Existing land disposal sites are either already committed, are no longer usable due to adjacent residential or commercial development, or are of insignificant holding capacity to warrant serious consideration. In addition, land disposal of certain types of material is questionable because it may create point sources of pollution. Other dredged material may be suitable for capping sanitary landfills but this material cannot be hydraulically dredged and pumped directly to the landfill because of the high water content of the material. Bucket dredging or hydraulic dredging with subsequent dewatering and rehandling of the material would be required. Pumping dredged material inland for long distances may be more costly than long barge hauls to acceptable open-water disposal areas.

Marsh development and "habitat creation" may prove to be viable solutions for small private projects where drag-line or bucket dredging is possible. Likewise, island-building has potential as a short-term alternative to open-water disposal, provided the island is to serve a dual purpose such as creating much-needed recreational lands. Along the Connecticut shore, however, there are probably few if any sites for island building which would be acceptable environmentally, socially, and economically.

Barging dredged material out of the Sound to the ocean is a viable but expensive alternative. Depending on the volume of material to be dredged and the distance to the disposal site, dredging costs can run from about \$2 to \$6 a cubic yard. An example of the difference in cost between open-water disposal in Long Island Sound and disposal in the Atlantic Ocean, is the Navy's removal of 1,800,000 cubic yards of material from the Thames River and disposal at the New London Dumping Grounds, which is located on the average about four miles away from the dredging site. This cost the Navy about \$1.70 a yard or a little over \$3,000,000 for the project. To dispose of these same materials at a yet-to-be-

certified Atlantic Ocean dumpsite, known as "East Hole", an additional twelve miles of barging would be required. At a cost of 5 cents a yard per nautical mile, ocean disposal would have boosted the cost of the project an additional 60 cents a yard, and boosted the total cost of the project by one-third, to approximately \$4,130,000. Despite these additional economic costs, DEP has actively sought to move the dumpsite to "East Hole" because of the potential environmental impacts of dumping Thames River spoil in the New London dumping grounds.

#### DEVELOPMENT OF A DREDGED SPOIL MANAGEMENT PLAN

Unfortunately, a single solution for the dredged material disposal problem is not currently available. As Commissioner Gill noted in his remarks at a dredging seminar in Stamford in October: "We must make a comprehensive survey of needs and options and from this develop a Sound-wide dredged material disposal management plan. Because the bulk of the dredged material dumped in the Sound originates in Connecticut, and the five disposal sites currently in use are all almost entirely in Connecticut waters, the State of Connecticut should take the responsibility for developing the plan in concert with the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency and the State of New York."

The Commissioner stressed that the DEP will seek assistance from citizens of the coastal towns and the academic community in developing the plan.

\* \* \* \*

FOR MORE INFORMATION ON DREDGING, WRITE DEP FOR A SHORT DISCUSSION PAPER ENTITLED DREDGING AND DREDGED SPOIL DISPOSAL IN LONG ISLAND SOUND. THE PAPER WAS PREPARED BY DEP AND IS AVAILABLE FROM THE OFFICE OF INFORMATION AND EDUCATION, DEP, ROOM 112 STATE OFFICE BUILDING HARTFORD, CT 06115







## **The Willimantic River Study**

In the October issue of the Bulletin an article on the progress of Connecticut's Clean Water Program described the improvements that have taken place in the water quality of the Willimantic River, causing part of it to be reclassified to a class "B" river.

One of the Institute's largest and most multidisciplinary research projects has been a study on the effects of the upgrading of the Willimantic sewage treatment plant on this river system. Various sections of the DEP, other State organizations, the U.S. Geological Survey, the Soil Conservation Service, and the local governments and citizens in the study area have cooperated in this project. Started in 1972, the project is scheduled for completion in December 1975.

In order to determine the relative effectiveness of the sewage treatment upgrading program, the study compared the "before" and "after" biotic makeup of the river system from approximately three miles above and below the outfall of the sewage treatment plant in Willimantic. Certain data, especially on fish and aquatic plant populations, were collected in a larger study area, which included tributaries of the Willimantic.

The study is outlined below:

**EFFLUENT PLUME STUDIES** were conducted to evaluate the composition of the secondary level effluent and its direct effects on the physical and chemical properties of the river water, which in turn affect the biotic properties of the system. Dye studies were made to track the flow of the plant effluent and its mixing with the Shetucket River.

**NUTRIENT STUDIES AND RELATED CHEMISTRY STUDIES.** An "algal assay" procedure was used to determine the potential of the river water sampled to support algae. This technique indicates the quantity of certain nutrients in the water, which in excess cause eutrophication and algal growth. The results indicated that nutrients in the river increased during the summer, due to a seasonal increase in mineral-laden groundwater to the river in addition to the normal treatment plant effluent.

The upgrading of the sewage treatment plant to the secondary level has been successful in removing organic carbon compounds which are not removed by primary type treatment. It has not, however, decreased the algal growth potential, since these nutrients continue to be discharged in the treatment plant effluent. The implementation of a tertiary, or advanced, treatment system or some possible recycling method would eliminate the nutrient-laden discharge.

Of the other chemical and physical parameters measured -- suspended solids, total alkalinity and pH -- no significant variation was recorded, indicating no appreciable effects on these due to the sewage treatment plant.

**ALGAL POPULATIONS** were studied, using a species usually found in large numbers in unpolluted waters to indicate the severity of sewage pollution. Of the two major algal species observed in the sampling area, the "indicator" species constituted a very small percentage of the total numbers found in the effluent plume. The percentage increased as distance from the sewage effluent increased. The other algae observed was a species adaptable to the higher nutrient levels found in the effluent plume.

**MICROBIAL POPULATIONS** were examined for effects of the sewage effluent. Downstream seasonal averages of the populations were substantially higher than upstream, except during the May to September chlorination periods. Dilution of the sewage treatment plant effluent was found to be the critical factor in determining the size and structure of downstream microbial populations. The investigators suggest that chlorination should be a year-round practice to upgrade the use classification of the Shetucket River.

(continued on page 12)

\* *THE CITIZENS' BULLETIN IS SUPPORTED IN PART BY FUNDS PROVIDED BY THE U. S. DEPT. OF THE INTERIOR, AS AUTHORIZED UNDER THE WATER RESOURCES RESEARCH ACT OF 1964, PL 88-379.*

## reader's forum



Dear Editor:

I received today your October issue of the Citizens' Bulletin and read it with considerable interest. It is good to see that this form of public information from your Department is again being distributed.

I cannot help but comment on the lead story which appears on the first two pages of the Bulletin. This deals with the completed Rainbow Dam Fishway and I regret that the Farmington River Watershed Association received no credit for insuring that this facility became a reality. Since the organization of the Association in 1953, a practical means of moving fish over this downstream barrier has been one of its objectives. Prior to my becoming associated with the organization, I know a great deal of effort was made by the former Executive Directors, by Directors and by Keith Palmer, a Director and an instructor at the Loomis School in Windsor. I am also certain that one of the important catalysts to having the Stanley Works become interested in constructing a fish passage device was the knowledge that this Association had secured and was about to use a petition with sufficient signatures to comply with the 1949 Act which directs the Commissioner to take specific actions in situations of this kind. Although the petition never was used, its presence had a persuasive effect.

I also note that your article indicates that the power station is owned by the Stanley Works Company of New Britain. In general terms this may be true, but for the sake of accuracy the power station is owned by the Farmington River Power Company, which is a subsidiary of the Stanley Works.

Resource management and the results that are obtained in Connecticut happens

THE CITIZENS' BULLETIN WELCOMES LETTERS AND OTHER READERS' CONTRIBUTIONS. IF YOU WISH TO SHARE YOUR IDEAS, PLEASE WRITE TO US: C/O EDITOR, CITIZENS' BULLETIN, DEPARTMENT OF ENVIRONMENTAL PROTECTION, ROOM 112, STATE OFFICE BUILDING, HARTFORD, CONNECTICUT 06115.

only with sincere public support. When this public support is forthcoming, I believe that State Agencies have a duty to acknowledge this support, especially in widely distributed informational materials such as the Bulletin.

Sincerely,

Roger Seamans  
Executive Director

FARMINGTON RIVER  
WATERSHED ASSOC.



## editor's note

We have received a fair amount of correspondence on two specific items which we thought we should answer for everyone's benefit:

### DELAY IN RECEIVING THE BULLETIN

The Bulletin seems to be severely delayed at various post offices. As a second-class mailed item, it does not receive the same priority clearance as a piece of first class mail, and consequently it sometimes spends three weeks enroute from us to you. Please bear with us - we are trying to increase our production lead time so that future issues will not report events which have passed by the time the Bulletin reaches you.

### CALENDAR

As a result of our production schedule and the necessary lead-time required in preparing, printing and mailing the Bulletin, we can no longer carry the Calendar, formerly a regular feature in past issues. We are instead looking into ways to mail notice of these hearings on a more timely basis....we shall keep you posted.

# The Federal Duck Stamp:

## Not Just for Hunters

Did you know that the individual American citizen can make a substantial contribution to the conservation of wild waterfowl in the United States simply by purchasing a \$5 Migratory Bird Hunting Stamp at the local Post Office?

The proceeds from the sale of these stamps -- known popularly as "Duck Stamps" -- go directly into the purchase of wetland habitat for ducks and geese. The stamp is issued annually and is required of all waterfowl hunters 16 years of age and older; the Interior Department, however, is now encouraging non-hunters who also enjoy the wildlife resource through photography and bird-watching to contribute to the U.S. conservation effort this way.

Since 1934 when Duck Stamps first went on sale, over \$160 million in revenue has been collected and used for the setting aside of close to two million acres of waterfowl habitat. Each year over two million hunters, by purchasing the stamps, provide close to \$11 million in revenue. It is hoped that more than half a million to a million non-hunting Americans will voluntarily purchase one of these stamps.

Waterfowl abundance and distribution are closely related to the availability of living space. When requirements for production, migration, and wintering are not fully met, waterfowl numbers decline. As estimated 127 million acres of wetlands existed at the turn of the century. By 1953, only 82 million acres remained intact, of which less than one-fourth was judged to be of significant value to waterfowl.

Estuaries and coastal wetlands, particularly along the mid and south Atlantic Coasts and the Gulf of Mexico, are wintering grounds for a major segment of North American waterfowl. During the period from 1922 to

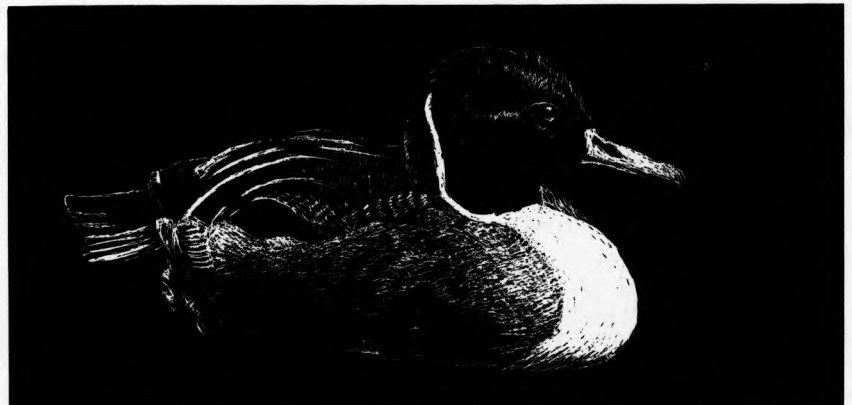
1954, at least 25 percent of shallow coastal water and marsh areas were destroyed.

73 percent of the Nation's estuaries have been moderately or severely degraded, according to a 1970 study. Recent estimates conservatively place the nationwide rate of loss of coastal wetlands at 0.5 to 1.0 percent annually.

Efforts to preserve these valuable wetland habitats are being made by various organizations and groups. The U.S. Fish and Wildlife Service, State conservation agencies, over 11,000 private waterfowl hunting clubs, Ducks Unlimited, Inc., and private conservation organizations such as the Nature Conservancy, the National Audubon Society, and local wetlands associations are all working to purchase wetland areas, thereby helping to insure that they are not lost. Total waterfowl habitat presently preserved by all of the above mentioned organizations and groups exceeds 22,900 acres in the United States and 1,800,000 acres in Canada.

The U.S. Fish and Wildlife Service hopes to use future duck stamp revenues to set aside and preserve the remaining vital waterfowl breeding areas.

So buy a duck stamp and help to buy more wetlands and waterfowl habitat!







# New Publications

• **YOU AND YOUR PERSONAL ENVIRONMENT** This is a superbly written guide to the "rules that regulate Connecticut's environment - and some thoughts on the reasons behind them." It covers air and water quality, wetlands preservation, solid waste and recycling, noise pollution, hazardous chemicals, wildlife, and land use. Copies of this publication are available from the Connecticut Audubon Society, 2325 Burr St., Fairfield, CT. 06430 or Suite 611, 60 Washington St., Hartford, CT. 06106. Cost is \$1.00 to cover printing and handling.

• **DIRECTORY OF CONNECTICUT CONSERVATION-ORIENTED ORGANIZATIONS** Available from the DEP Office of Information and Education (Room 112, State Office Building, Hartford, CT 06115) this directory lists conservation groups and land trusts throughout the state. Updated to October, 1975.

• **GAS WATCHERS GUIDE** The Gas Watchers Guide is a 16-page pamphlet outlining ways to conserve gasoline. Suggestions are compiled under six categories: to-and-from work trips; daily family business trips; family education, civic and religious activities; keeping your car in tip-top shape; good driving techniques. Individual copies of the Guide and a bumper sticker are available free of charge at any Connecticut Motor Club office. Information about bulk orders is available from Public Information Dept., Conn. Motor Club, 2276 Whitney Ave., Hamden, CT. 06518.

• **CONNECTICUT STATE MAPS** The 1975 revised edition of the Connecticut State Map on a scale of 1:125,000 (one inch equals approximately two miles) has been published by the United States Geological Survey, according to Dr. Hugo F. Thomas, State Geologist. This is the first updating of the map since it was originally published in 1965. With nine distinctive colors, the map which measures 44 inches by 56 inches, makes an attractive wall hanging or an excellent base on which to plot additional information.

The information shown on the map includes all Interstate, Federal, and State highways, the major connecting roads, railroads, state parks and forests, streams, lakes, ponds, and reservoirs, plus the names of over 700 localities. Heavily populated or built up areas are tinted in yellow to indicate trends of intensive urban development. Relief features are shown by means of brown contour lines in 50 foot intervals for land, and with blue depth curves and soundings in feet for Long Island Sound.

The new revised 1975 edition is available in 3 editions: 1) planimetric edition (base map with towns, highways, and water bodies) for \$1.00; 2) topographic edition (with contour lines, built up areas, state parks, forests, and fish and wildlife areas in color added to the planimetric base) \$2.00; 3) topographic edition with woodland overprint (light green indicating forested areas) \$2.00.

These maps may be purchased at the State Library, Sales and Publications Office, Hartford, CT. 06115 for the price of the map plus sales tax. Over the counter sales are recommended to eliminate mailing a cumbersome tube which is easily damaged in the mail.

• **CONNECTICUT BICYCLE RIDES** In June of 1974, the DEP published a book containing 30 bicycle rides throughout the state, with the kind cooperation of the Hartford Council of the American Youth Hostels. Only a limited number of copies were originally printed. We are now very pleased to be able to announce that copies of this popular book are once again available. AYH has reprinted the book in quantity and copies can be obtained for \$1.75 at the AYH Office, 1007 Farmington Avenue, West Hartford, CT 06107 during the hours of 6-9 p.m. Tuesdays and Thursdays. If you wish a copy by mail, there will be an additional 50¢ charge for postage and handling.



Connecticut Yankees have a long-standing reputation for thrift, and yet few Nutmeg residents have even briefly considered the offer of free heat and hot water for their houses. It's something akin to the experiment tried every once in a while by a college Psychology I class... stand on a street corner and offer free dollar bills to passers-by, and note how many people figure there's something fishy and refuse the money.

The free fuel being offered is the basic source of all the fuels which are now so costly: coal, oil, wood and natural gas. As Groucho Marx used to say of the secret word on his old television show, "it's something you see every day."

It's sunlight.

## SOLAR ENERGY: a bright prospect



Solar energy research and technology have been given a big boost since the "Energy Crisis" winter of 1973, when the message began to get through that our fossil fuel supplies were not limitless. Soon after, the U. S. Energy Research and Development Administration (ERDA) was formed, which serves as the primary federal agency in promoting alternatives for meeting the nation's future energy needs. The goal of ERDA's solar energy program is to provide the option of solar energy as a viable energy source possibly providing up to 25% of the nation's energy needs by the year 2020.

### CONNECTICUT DEVELOPMENTS

The most promising use for solar energy in Connecticut is for heating and cooling individual buildings on a direct thermal basis. Test installations already in place throughout the United States have shown that even on a very cloudy day there is sufficient light to generate a surprising amount of heat. Significant improvements are continually being made in ways to store this heat for use at night or during periods of extended bad weather.

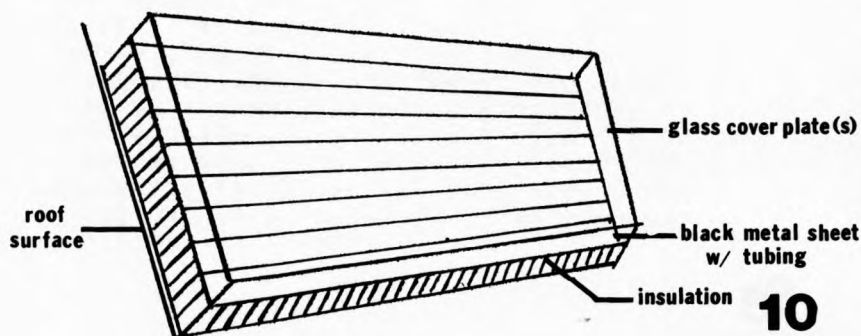
At least nine organizations in Connecticut are already working on the design and installation of solar-heating systems. According to Commissioner Lynn Alan Brooks of the Department of Planning and Energy Policy (DPEP), Connecticut currently has some of the top solar equipment designers in the nation. DPEP is aware of over half a dozen houses in the state which are partially heated with solar energy. One such house is designed for future installation of a solar space-heating system, to accompany the less expensive solar hot water heating system installed now.

Connecticut's state government, in fact, has been actively promoting and testing solar energy equipment. A solar heated armory is planned in Norwich; and in an elderly housing project in Hamden, twenty units are being built with conventional heating only, while the other twenty will have solar units in addition to their conventional systems. The Hamden project will provide an excellent test case for solar energy by allowing the comparison of fuel savings over a long period in identically-constructed dwellings.

#### HOW IT WORKS

There are many applications of solar energy, each involving a different technology. This article will focus on the use of solar energy for heating buildings, primarily because this technology has progressed the furthest, but also because 65% of the energy consumed in Connecticut's residential sector goes for space heating.

The essential components of a solar heating system serve the functions of collection, heat transfer, storage, and distribution. Collecting solar radiation for heating a building is accomplished through the "greenhouse effect": the principle that visible light rays, after passing through glass, are transformed from light into heat energy. This infrared heat energy will not pass back through the glass, and thus is trapped in the controlled air space. Here's a simplified diagram of a solar collector:



The collected heat is then transferred through a medium such as water or air directly to the heat distribution system or to a storage area. Since solar heat can only be collected during the daytime hours, storage of the heat is necessary in the form of either a large tank of water, or a bin of crushed rock if air is the medium. When the house calls for the stored heat at night or during a prolonged period of cold cloudy weather, it is transferred to the living space for heating or to the domestic hot water supply, as needed.

There are certain requirements a house should fulfill before a solar heating system can be installed. An absolute essential is good insulation. Proper orientation of the house toward the sun (south-southwest), provisions for natural ventilation, and ample roof area (or ground space) are also important.

Much of the hardware for the system is readily available commercial equipment in general use: motors, pumps and blowers, heat exchangers, controls, pipes and fittings. The most exotic and often most expensive piece of equipment in the system is the collector. At least 69 firms across the country produce solar collector panels, according to a recent Federal Agency Administration count. Connecticut DPEP has material on file (available to the public) from many of these manufacturers.

#### HOW MUCH IT COSTS

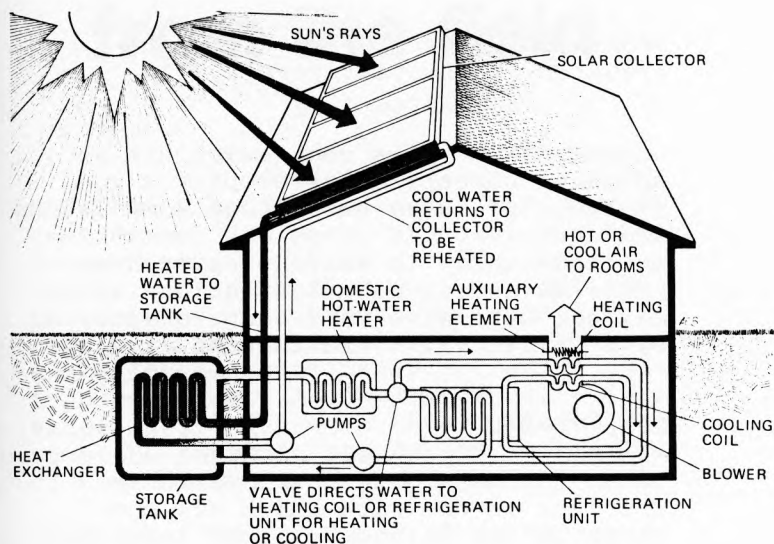
At the present time the decision to "go solar" is determined by the ability or willingness of a homeowner to pay an initial premium in order to get future savings. Depending upon a wide range of variables, a homeowner can expect to pay a premium of \$6-8,000 for a solar space heating system, in addition to the cost of a conventional back-up system. Back-up is needed because it would be economically prohibitive to build a 100% solar-heated home. Connecticut's solar experts generally agree that replacing 50-60% of the conventional fuel use by solar heat is a more practical expectation.

As with most innovations, the cost of solar collectors is still high. Expansion of the industry was delayed by the "chicken or the egg" syndrome: Costs will remain high until solar devices can be produced in quantity, but they can't be sold in quantity until prices come down.

As a result, this high capital cost has posed a stumbling block, which must be dealt with if solar energy use is to grow. Tax incentives are



one way of reducing installation costs, and some form of federal income tax deduction for solar energy systems is expected to come out of the 94th Congress. A number of groups and individuals are working with Connecticut state legislators on possible solar incentive legislation for the 1976 General Assembly. A dozen other states have already enacted similar legislation providing tax relief for solar installations.



Solar Energy, however expensive, is nonetheless making headway due to the continuing escalation of the cost of fossil fuels. It has become especially critical, since Connecticut relies on petroleum for nearly 80 percent of its energy needs. The higher costs of these fossil fuels are therefore encouraging more and more potential customers to consider installing solar equipment, as their initial investment will be paid back in a shorter period of time.

\* \* \* \*

It took millions of years to make this earth's supplies of oil, coal and natural gas, and it is clear that these fuels will be depleted before more of each can be formed. Experts say the supplies controlled by the U. S. will last only 50 more years.

The sun, on the other hand, quietly and without effort, dumps enough free energy on the average house every day to completely supply its average heating or cooling needs.

You might call it a ray of hope.

*For more information on solar energy, you may wish to contact the Department of Planning and Energy Policy, 20 Grand Street, Hartford, 566-5803.*

## solar energy course

A ten week course on "Solar Energy for Buildings" will be offered by the Hartford Graduate Center from December 2, 1975 through February 10, 1976. It will provide the background necessary for the design of solar heating and hot water systems for buildings. A familiarity with algebra, trigonometry and physics will be assumed.

Lectures will emphasize the design of components and systems, appreciation of the state of the art and techniques for evaluation of performance claims. After a review of heat transfer fundamentals, students will learn to predict the energy requirements of buildings and the seasonally-variable energy which is available from the sun at a given location. Solar collector construction and performance will receive special attention so that wisely designed commercial collectors can be selected. Methods for making economic analyses to determine optimal collector area and heat storage volume will be discussed, and the potential for future solar applications explored. Through concurrent assigned problems a complete residential solar heating system will be designed and evaluated.

This course will meet 10 Tuesday evenings 7:00-10:00 p.m., at the Hartford Graduate Center, 275 Windsor Street, Hartford. The tuition fee is \$250. For further information contact Don Florek, Program Manager, Special Programs, The Hartford Graduate Center, 275 Windsor St., Hartford, Ct. 06120 - Telephone (203) 549-3600 x 253.



**Oops...**

In the October issue we mistakenly listed:

- \* Report No. 22 for the Institute of Water Resources (page 13) as costing \$2.00. It costs \$3.00.
- \* The 1975 Deer Season dates for muzzleloader as running from December 6 through 13 (page 15). It runs instead from December 8 through 13.



# Conservation Commission Corner

by Gay Ewing

Connecticut Assoc. of  
Conservation Commissions

**NORWALK** I visited the Norwalk Commission on the very first day its new administrative secretary came on the job. For the first time this commission has a desk in City Hall Annex. As planners surveyed maps and got their coffee in the next room, Helen Charnes, Chairman, and Christine Detroy, the new administrative secretary (who, by the way, has been hired under the Manpower program), discussed what an administrative secretary to a conservation commission does first. We looked at the piles of material Helen had brought in, and finally decided that we would have a good review of what the commission has done over the last few years. Christine told me that she was taking a group of girl scouts up to Kent State Park that weekend, and said that she plans to do other work with children.

**EASTON** This meeting was attended by members of the Board of Education, teachers, and two forestry students from Yale. The students had a six-week contract with the town to make an evaluation of the wetland areas and to give any technical help which the commission felt necessary. The commission is particularly concerned that agricultural land be preserved. There is one area in town which may be lost if this program does not succeed.

**WESTPORT** The Westport Commission is also the Inland Wetlands agency and has in addition worked to protect the tidal wetlands. A complete list of all town agencies which deal with environmental

programs has been printed and distributed to the taxpayers.

**WOODBIDGE** This commission has an advanced concept of developing a good exchange of ideas among town commissions and agencies. It gives the commission an opportunity to discuss environmental problems and to submit solutions which may not otherwise have been considered by a particular board in town.

P.A. 75-342

**AN ACT CONCERNING FREEDOM OF INFORMATION**  
This act is one with which all commissions and Inland Wetlands agencies should make themselves familiar. Those commissions which are also Inland Wetlands agencies may want to consult legal counsel to make sure that no decision made is negated because the letter of the law has not been followed. Another area of concern should be the land acquisition program.

**DO YOU AGREE** that the most complicated and difficult procedure is that of acquiring land with State and Federal funding? If so, please send in suggestions as to how the Connecticut Association of Conservation Commissions could be helpful. As you know, the October 20th workshop covered this subject, and I am writing a pamphlet which should clarify some of the problems. Call me at 434-8495 or write Gay Ewing, General Delivery, Old Lyme, Connecticut 06371.

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## INSTITUTE OF WATER RESOURCES

(continued from page 5)

**SPECIAL STUDIES** were conducted to determine the amounts of heavy metals (such as lead and copper) and pesticides present in aquatic plants and sediments. Results showed that the sewage treatment plant did not play a significant role in either the quantity or location of heavy metals found. It was discovered that pesticides and heavy metals remain in the river flow as a significant part of the sediment and plant communities, but their total effect

is complex and not fully understood. The sources of these are thought to be industrial discharges into the upper Willimantic, automobile exhaust pollution and the agricultural use of pesticides.

**FISH POPULATION STUDIES** showed that the secondary sewage effluents increased the nutrients available to fish and allowed the proliferation of some species.

As the project nears completion, the final conclusions will be presented in detail in forthcoming articles, as well as in a report for the Institute's Report Series.





## from the field

by Douglas Starr

Bob Senack spends three to four days per week in the field as Inspector for the Water Compliance Unit of DEP. He is one of ten inspectors who, in addition to a variety of investigative duties, regularly checks industries for operation and maintenance of their pollution control equipment in compliance with Clean Water laws. His work covers District I: about 60 towns in the Northwest quarter of Connecticut.

On October 14 we toured three companies in Torrington as part of his regular inspection schedule. At the present rotation each industry in his district is inspected on the average of once every two or three months. The companies we toured all ultimately discharge to the Naugatuck River--either directly to the river itself or to tributaries nearby.

The first stop we made was at the Union Hardware Company in Torrington. Union, like the other companies we saw, includes metal plating as part of its operations and removes plating wastes from its discharge before releasing it.

Superficially, metal plating resembles colonial candle dipping, especially in smaller operations where it is done by hand. Racks of metal pieces are dipped from tank to tank, and after each plating tank emerge with a new coating. The tanks contain metal ions in solution which, when charged with electricity, adhere to the items to be plated. Between these ion baths are other tanks of rinse water to remove "drag out", or carry over, from the previous solution.

The tanks are set up in a series to be done in a given order. A piece to be plated with chrome, for example, will go through a series of ion baths and rinses, with each previous coating affecting the adhesion of the chrome. A piece to be plated with nickel may only have to be plated with copper first.

The pollution in this process occurs when the rinse and used ion solutions are discarded. They contain metal ions, acid, and cyanide which, if untreated, pollute surface and ground waters.

The solution--and not a cheap one--is to remove the toxic substances from the wastewater before it is discharged. The companies we visited--Union Hardware, Colonial Bronze and Turner and Seymour Mfg.--spent \$500,000, \$50,000, and \$250,000 respectively on their pollution control equipment. The price does not include operation and maintenance costs.

Union Hardware, our first stop, is a division of Brunswick Corporation. This Torrington company makes roller skates, golf club shafts and other tubular products for sports equipment. They plate these items with zinc and chrome.

The company installed their pollution control equipment in 1971.

Cecil Harrison, Union's Water Pollution Chief, accompanied us through the water treatment room. We had come unannounced. "We don't make it a policy to announce inspections," Senack said, "though we do call in advance for special surveys."

Harrison said a problem had come up earlier that day. The shaft to a pump that pumped lime to an acid neutralizing tank had broken. Until it was fixed he would have to pour the lime by hand. He expected the pump to be fixed soon.

Senack checked the meters and charts that monitor the control equipment, then went outside to inspect the settling lagoons and sludge drying beds. Settling lagoons are small ponds lined with tar paper and plastic that allow solids to settle out of treated discharge water. While the liquid in the lagoons has the consistency of thin mud, the water that runs off is clear with just a pale yellow tinge. Sludge that accumulates is dried in beds and taken twice a year to municipal drying beds for further drying and, eventually, for sanitary landfill.

Beyond a fence and down a small embankment from the lagoons was the West Branch of the Naugatuck River. The water ran clear and several small bass could be seen in the eddies.

"Within six months after the equipment was on-line we began to see fish," Harrison said. "Live ones. Previously, fifty per cent of the sludge you see in the lagoon was in the stream. The bottom and banks were dark green, and



in the summer it smelled. The change is gratifying."

Senack lowered a plastic dipper to the discharge pipe and took a grab sample of the effluent for testing. He performed two field tests for substances which, if found in high concentrations, could cause immediate damage to the stream. "If we found dangerous concentrations of toxic wastes we'd get a lab test right away. If the problem was confirmed we'd call the district engineer and start necessary action--maybe shut off the flow in an extreme case."

With no immediate problem, a gallon of the discharge was set aside to be taken to the Wesleyan University Chemical Laboratory at the end of the day. Results of the lab tests are reported to DEP and to the company tested.

The inspection of Union Hardware, plus explanations for my benefit, took little more than an hour. Before we left Harrison said he'd call Senack about the broken pump. He called later that day, saying that the pump had been fixed by early that afternoon.

The day's other two inspections followed the same pattern as the one at Union: checking meters, looking over operations, speaking with supervisors about operating problems and taking a gallon of the final discharge for analysis. Senack also spent time speaking with men on the factory floor, since "they often have a good knowledge of the processes and have ideas on how to solve operational problems."

At Colonial Hardware, a small firm that makes and plates cabinet hardware for household use, there was a small problem with a pH meter. Tied to an alarm system designed to sound if discharge became too acidic, the meter kept giving false alarms. It had been removed and adjusted, but not yet reinstalled. On-site testing indicated no major problems, though, and the supervisor called Senack later that day to say the meter had been reinstalled.

At Turner and Seymour, a larger firm specializing in metal finishing of chains and upholstery nails, wire forming and stamping, commercial can openers and now, a cast iron stove, there were no problems. Their discharge--120,000 gallons of yellow tinted water per day--was treated for removal of metal ions, cyanide, solids, and for neutralization of acids and bases. The plant manager said that in addition to present treatment practices the company planned to divert and re-use part of the waste stream as rinse water.



The attitudes of the plant managers we visited were fairly unanimous: the initial expense of wastewater treatment was high but now, after seeing the improvement in the Naugatuck River, it seemed justified. Senack elaborated: "When we did the original survey work, some companies said we'd put them out of business. But now after they've installed the equipment I see they're still operating."

Not many years ago the Naugatuck River below Torrington was too toxic to support life. Now fish can be seen in its clear waters and, according to DEP Water Quality Standards, parts of it are suitable for bathing.

## Permit Information Office

In a continuing effort to better serve the needs of municipalities, private organizations, and individual citizens, a Permit Information Office has been established in DEP for the specific purpose of coordinating DEP permit procedures. Specializing in prompt, efficient service, and functioning as a one-stop service point for permit information, the Office will be able to answer questions concerning the need for various environmental quality permits, the status of any current permit applications, and any inquiries of a general nature concerning the permit process.

Coordinating the Permit Information Office will be Mrs. Alda Noonan, thirteen-year veteran of the DEP. Formerly the Executive Secretary to Don Matthews of the Park & Forest Commission, and to Commissioners Lufkin, Costle and Gill, Mrs. Noonan brings invaluable experience to her new post.

Mrs. Noonan may be reached at (203) 566-4018, or in Room 114, State Office Bldg, Hartford, CT 06115.

# Learn about land use

Most communities have started to move toward the development of environmentally sound land use policies. Based upon the expressed needs of several communities in the state, E-P Education Services, an environmental resource center, has developed individualized instructional materials on land use decision making processes under sponsorship of the H.E.W. Office of Environmental Education. These materials are designed for use by members of communities, community agencies and secondary schools.

The development of the materials has proceeded in a unique manner. A sample of decision makers in Connecticut's towns were asked to share their experience relating to the need for community education in the area of land use decision making. Their responses have shaped the backbone of the program.

The instructional mode of the program integrates audio-tutorial materials (15 cassette tapes and 120 35mm slides), with simulation materials, work sheets, and field work. This innovative approach allows individual community members to study land use decision making in their home, office or school, on their own time, at their own pace. The program has the potential for

adults and students to study similar material with subsequent benefits of increased communications in the community.

Unit	Introduction
Titles:	Economics of Land Use
	Map Reading
	Aerial Photography
	Geosystems
	Hydrosystems
	Uplands
	Open Space
	Inland Wetlands
	Coastal Wetlands
	Planning for People
	Local Implementation
	State Implementation
	Federal Implementation
	Cultural Systems
	Buildability
	Attractiveness

A series of workshops have been scheduled for distribution of these kits. Valued at \$200, one complete kit will be distributed to each community free of charge.

For additional information on the LAND USE DECISION MAKING KIT or the workshops contact: E-P Education Services  
21 Merritt Street  
Hamden, Ct. 06511  
Telephone 203-777-1436

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## give it to a friend

### DEP CITIZENS' BULLETIN SUBSCRIPTION FORM

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AMOUNT ENCLOSED..... CHECK..... MONEY ORDER.....

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MAKE ALL CHECKS OR MONEY ORDERS PAYABLE TO: CONN. DEPARTMENT OF ENV. PROTECTION

Send to: Mary Ann Dickinson, Editor, Citizens' Bulletin  
Room 112, State Office Building  
Hartford, Connecticut 06115

THANK YOU !!



# EPA Citizen Briefing

The Regional Office of the U. S. Environmental Protection Agency will hold its annual New England Citizens' Briefing on December 5 at John Hancock Hall, 180 Berkeley Street, Boston, from 9:30 a.m. to 4:00 p.m.

This year's Briefing is a special occasion, since it is also an anniversary celebration for the Environmental Protection Agency, which marks its fifth birthday December 2nd. Keynote speakers will include Russell Peterson, Chairman of the President's Council on Environmental Quality, who will discuss "Growth In America" and John Quarles, Deputy Administrator of the Environmental Protection Agency, who will focus on "Future Directions of the Environmental Movement."

Other featured speakers will include John A. S. McGlennon, Regional Administrator of the EPA, who will review environmental cleanup efforts in New England; Gladwin Hill, national environmental correspondent for the

New York Times, whose topic is "The Environmental Movement - Is It Dead?"; Dana Duxbury, Solid Waste Specialist for the League of Women Voters of the United States, who will discuss "Solid Waste Problems - A Citizen's Viewpoint," and Dr. David Rose of the Massachusetts Institute of Technology, who will analyze "Energy Alternatives for New England."

Another highlight of the program will be the presentation of annual environmental awards to those from New England who have made an outstanding contribution on behalf of the environment.

The general public is invited to attend the briefing. Admission is free of charge. Further details or information can be obtained by contacting the Public Affairs Office, EPA, Room 2203, JFK Federal Building, Boston, Mass. 02203 or by telephone (617) 223-4704.

\* SOLAR INSTALLATION ILLUSTRATION ON PAGE 11 COURTESY OF POPULAR MECHANICS, 9/75

## DEP Citizens' Bulletin

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